

Notice of Allowability

Application No.

10/625,800

Examiner

Emmanuel Omotosho

Applicant(s)

PLANK, RICHARD G.

Art Unit

3714

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 08/10/07.
2. ☒ The allowed claim(s) is/are 1,3,6-12,14-20 now renumbered as 1-16.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

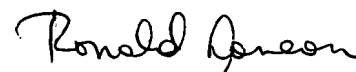
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


RONALD LANEAU
PRIMARY EXAMINER

Reasons for Allowance

1. The following is an examiner's statement of reasons for allowance:

Claims 1,3,6-12,14-20 (now renumbered as 1-16) are allowed.

A key aspect of Otten's system is that the special adhesive tape must be applied to the bottom surface of the golf club. The reflective tape is not optional and only used to filter for artifacts and shadows. The purpose of the reflective tape is to reflect a narrow beam of infrared light transmitted onto the underside of the golf club onto detector elements associated with the sensors 12(a)-(d), (see Col. 3, lines 41-49). "The light striking the detectors is modulated by the passage of the reflective tape 19 as the 8 club 16 travels along the swing path 18." (See Col. 3, lines 55-57). Otten's system will not 9 operate with out reflective tape.

In every application, the decision to use either IR or ultrasonic sensors depends on the object being detected, the nature of the movement, and what movement data is being calculated. Because IR sensors use light energy (2.99×10^8 m/sec) and the ultrasonic sensors 9 use sonic energy (344 m/sec), they are not interchangeable when transmitting signals that 10 reflect off moving objects where the speed of the signals are critical for accurate measures. Claims 6 and 15 both recite each infrared sensor made up of infrared emitter and an infrared photodiode detector. By using 'pulsing' infrared energy, artifacts and false signals are eliminated. More specifically, each IR sensor includes an IR LED (light emitting diode) that produces a narrow cone of high power light that is strobed (pulsed on and off) vertically at a set frequency generated by the

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micro-controller. Each IR sensor also includes an IR photo detector (adjacent to each IR LED) placed under an IR filter (at the top of the nylon bushing holding both IR sensors in an injected molded part) the prevents a broad spectrum of ambient light from passing through the filter which limits transmission of a specific frequency of light (about 880 nm) (recited in Claim 8.) Under the filter, a specially designed lens has been placed to focus reflected IR light passing through the filter onto the active area of the photodiode, in effect, magnifying the strength of the IR energy that does make its way through the filter and lens (recited in Claim 9). An AC (alternating current) coupled amplifier is connected to each photodiode (to "magnify" and convert the small current produced when the photodiode detects IR energy to voltage). The amplifier is electrically designed to only respond to (detect) pulsing reflected IR energy of a certain frequency, which is generated by the micro-controller.

2. Even if a plastic cover was not used, ultrasonic sensors cannot be used in place of IR sensors in either Otten's or Ogawa's application because the club head will pass too close to the sensor for detection. A single ultrasonic transducer must be operated in "pulse-echo" mode to detect a target. A minimum separation of more than 5 inches between the sensor and the target, such as a club head, is required to allow the transducer to stop "ringing" after the sonic package is transmitted (when detection can begin) and to account for round-trip travel of sonic energy at a typical speed of sound (SOS), which is about 13,500 inches per second in air. Minimum time to detect a target at minimum range in "pulse-echo" mode is about 750 18 uSec, which equates to roundtrip travel of sonic energy (distance -- SoS x time) of about 10.125 inches. The

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minimum sensor-target separation, therefore, is $10.125/2 = 5.06$ inches to use an ultrasonic sensor in pulse-echo mode. With Applicant's device, two ultrasonic sensors are aligned on the ultrasonic sensor base 6 inches apart and approximately 6 inches away from the club head that will pass in front of each of the sensors. During use, the ultrasonic sensor base is rotated so that it is perpendicularly aligned with the infrared sensor base. The two ultrasonic sensors precisely measure the distance between the sensor and the club head as the club head passes immediately in front of each of the ultrasonic sensor. By comparing the two distances measured by the two ultrasonic sensors, the swing path angle is calculated. In order to accurately calculate the swing path angle, the distance between the ultrasonic sensor and the club head is measured to less than 1/10 of an inch. A difference of about 1/8" between the distances that the club head passes in front of each of the two ultrasonic sensors calculates to a swing path angle of 1 degree. This method of measuring swing path angle is different and far more accurate than the measurement method disclosed in Otten.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

EXAMINER'S AMENDMENT

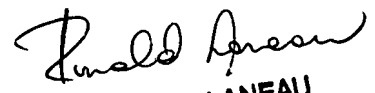
The application has been amended as follows:

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In claim 1, Insert --and approximately six inches apart,-- on line 13 after "and equal distance from said center axis"

In claim 15, Insert --and approximately six inches apart,-- on line 19 after "axis"

E.O.



RONALD LANEAU
PRIMARY EXAMINER

8/23/07